

electrical components on a circuit board having a recess, with the power part being connected to the logic part through wire bonding techniques, as is depicted in Figures 1 and 7-11 and referenced by numerals 231, IC1-IC4, and W. Finally, the Examiner maintains that Oshima depicts in Figure 1 and Figure 9 the mounting of the power substrate to a cooling plate (referenced as 225 in Figure 1 and 270 in Figure 9) with at least a portion of the circuit board also being mounted to the cooling plate. The Applicant respectfully disagrees with this rejection.

The applicant has amended claim 1 to include the limitation that only the portion of the circuit board immediately surrounding the power substrate is mounted to the cooling plate. The applicant submits that this feature is not disclosed in Oshima. Referring to Figures 6-11 of Oshima, depicted therein is a power substrate 221 having a substrate body 222 designed to radiate heat. "The thickness of the power substrate body 222 is decided in consideration of required mechanical strength and heat radiation property..." (see Oshima, column 11, line 66 to column 12, line 1). Conversely, the control substrate 231 is comprised, in part, of logic components supported by a circuit board comprised of a metal plate 232 which is mounted to resin spacer 240. Furthermore, the circuit board carrying the logic components includes a cutaway allowing the power substrate body to be located therein. Nothing in Oshima discloses mounting a cooling plate to the power substrate in addition to the portions of the circuit board surrounding the power substrate.

In reference to the specific rejections of the Examiner, Figure 1 of Oshima does not depict the pattern 225, referred to as a cooling plate in the Examiner's rejection, as being mounted to the control substrate comprising the circuit board with the logic parts. Rather, the pattern 225 is mounted only to the power substrate body 222. Furthermore, Oshima depicts mounting the circuit board to patterns 224, which is in turn metallization-bonded to the power substrate body (see Oshima, column 11, lines 63-66). This is also true in Figures 7-11.

However, the applicant respectfully disagrees with the Examiner's assertion that figure 9 of Oshima shows a portion of the circuit board of the logic part mounted to the heat conducting plate. Referring to Figure 1 of Oshima, the circuit board to which the logic parts are affixed is mounted to a resin spacer 240. Oshima clearly describes the spacer 240 as a component distinct from the logic or control substrate. Column 12, lines 7-24 of Oshima describes the structure of the control substrate while column 12, lines 25-39 describes the structure of the spacer. As can be seen in the patent, each of these

descriptions are given unique titles, clearly showing that the resin space 240 is distinct from the control substrate. Consequently, no portion of the circuit board of the control substrate is mounted to the cooling plate, as claimed in claim 1, but rather the circuit board is mounted to the resin spacers which are, in turn, mounted to the cooling plate. Therefore, the applicant believes that if the resin spacer 240 is interpreted as a component distinct from the circuit board of the logic part, then claim 1 is clearly not anticipated by the invention disclosed in Oshima.

In the alternative, even if the resin spacers 240 were considered as a portion of the circuit board, the mounting of the spacers 240 to the cooling plate 270 does not satisfy the limitations as set forth in claim 1. Claim 1 requires only the portion of the circuit board located near the power substrate be mounted to the cooling plate. Conversely, as seen in Figure 9, the entire spacer 240 is mounted to the cooling plate 270. Therefore, the applicant believes that even if the resin spacer 240 is considered as part of the circuit board, the limitations of claim 1 are not anticipated by the invention disclosed in Oshima. Based upon these differences, the applicant respectfully submits that Oshima does not disclose all of the features set forth in claim 1.

As stated above, the applicant believes claim 1 is now in condition for allowance and respectfully requests passage thereof. Furthermore, as all remaining claims ultimately depend from allowable claim 1, the applicant submits that the remaining claims are also in condition for allowance. In addition, applicant also has amended the specification and drawings to correct mistakes and requests the withdrawal of the Examiner's objections of the drawings. Therefore, passage to issuance is respectfully solicited. If necessary to effect a timely response, please consider this paper a petition for extension of time sufficient to make this response timely and charge any fees due therefore, and charge any other fees due and credit any overpayment of fees to Baker & Daniels Deposit Account No. 02-0387 (72262.90020).

Respectfully submitted,



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Dec. 24, 2002
Date


Eric J. Groen, Reg. No. 32,230

"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

In the Specification:

Please replace the first paragraph of the specification, as filed with the following:
The construction according to the invention on the one hand minimizes the necessary connecting technology, reducing it to bonding and direct soldering in the system circuit board, on the other hand, the horizontal type of construction results in an advantageously flat module. The module may be mechanically locked in a housing {8} **(not shown)** in particular by way of its cooling plate.

Please amend claim 1 to read as follows:

1. (Amended) An intelligent power module comprising a power part of the electronic components of which are arranged on a power substrate, and a logic part of the components of which are arranged on a circuit board having a recess in which said power part is located and electrically connected to the logic part by means of wire bonding techniques, said power substrate being mounted on a cooling plate, **wherein {at least} a portion of said circuit board {being} is mounted on the cooling plate, the portion surrounding said power substrate.**

FIG 3

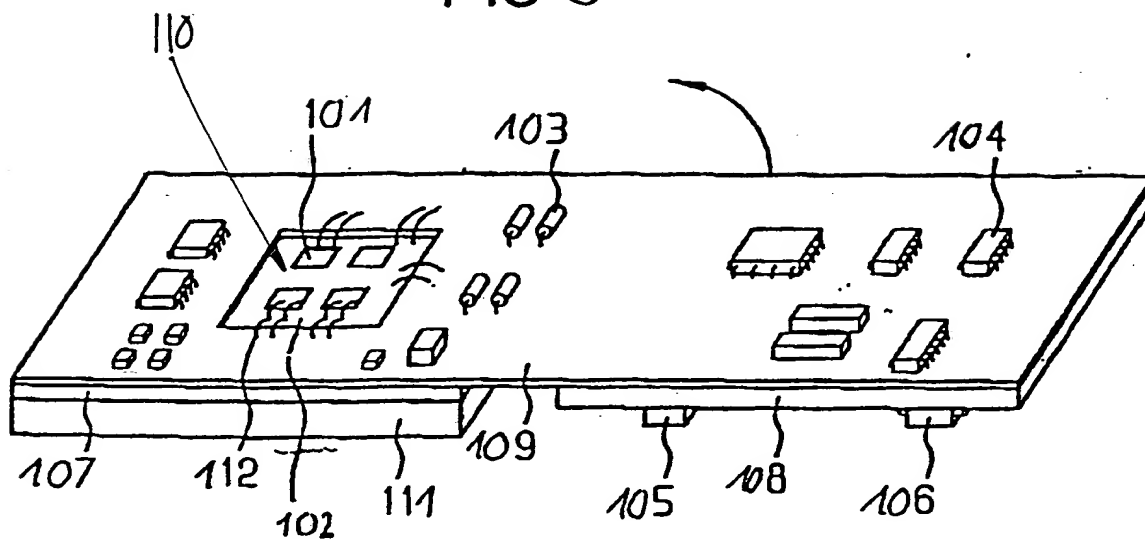


FIG 4

